



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/798,398

03/12/2004

Norihito Tsukahara

2004_0211A

6041

513

7590

06/27/2006

WENDEROTH, LIND & PONACK, L.L.P.

2033 K STREET N. W.

SUITE 800

WASHINGTON, DC 20006-1021

EXAMINER

PATEL, ISHWARBHAI B

ART UNIT

PAPER NUMBER

2841

DATE MAILED: 06/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/798,398

Applicant(s)

TSUKAHARA ET AL

Examiner

Ishwar (I. B.) Patel

Art Unit

2841

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 5-12 is/are pending in the application.
- 4a) Of the above claim(s) 8-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7,11 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 7, 2006 has been entered.

Specification

2. The disclosure is objected to because of the following:

The limitation "said corresponding cross-sectional size of said electrode pad is more than twice as large as said cross-sectional size of said connection terminal" in the newly added claim 11, has not been described in the specification.

The claim or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description (see 37 CFR, 1.75 (d)).

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 4-6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Capote (US Patent No. 6,297,560) in view of Gilleo (US Patent No. 6,252,301).

Regarding claim 1, Capote, in figure 3, discloses an electronic circuit device comprising: an electronic component (10) having a connection terminal (24) on one side thereof; a circuit board (20) and having an electrode pad (12); an adhesive sheet (22) having a through-hole (18), and a conductive adhesive (14) filled in said through-hole (18); wherein said electronic component (10) and said circuit board (20) are bonded to each other via said adhesive sheet (22), and said connection terminal on said electronic component and an electrode pad on said circuit board are bonded to each other by said conductive adhesive in said through-hole (see figure 3), wherein a cross-sectional size of said connection terminal(24) is less than a corresponding cross-sectional size of said through-hole (18, see figure 3), and said corresponding cross-sectional size of said through-hole is less than a corresponding cross-sectional size of said electrode pad

Art Unit: 2841

(cross sectional area of the hole near the pad 12 is smaller than the that of the pad 12, see figure 3).

Capote does not explicitly disclose that the circuit board is made of polymeric resin sheet. However, Capote recites that the circuit board is a polymer circuit board, such as made of epoxy glass (column 1, line 36-60). Further, the use of polymeric resin sheet for making a circuit board is old and known in the art. Gilleo, in figure 1, discloses a semiconductor chip assembly having circuit board (120) made of polymeric resin sheet (column 5, line 16-20).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the circuit board of Capote made of polymeric resin sheet, as taught by Gilleo, as is old and known in the art.

Furthermore, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960).

Regarding claim 2, the modified board of Capote further discloses said connection terminal (24) protrude into said through-hole (18, see figure).

Regarding claim 4, the modified structure of Capote further discloses said polymeric resin sheet is made of polyimide (Gilleo, column 5, line 19-20, made of Kapton®, which is a polyimide film from DuPont).

Regarding claim 5, the modified structure of Capote discloses all the feature of the claimed invention but does not disclose said conductive adhesive is a conductive paste consisting essentially of conductive particles and thermosetting resin. Capote discloses a solder material. However, use of conductive paste made of conductive particles and thermosetting resin binder, as an alternative material to a solder for electrical connection is old and known in the art. Gilleo discloses use conductive paste made of conductive particles and thermosetting resin (column 5, line 8-13) for electrical connection.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to further modify the board of Capote with the conductive adhesive made of conductive particles and thermosetting resin, as taught by Gilleo, as is old and known in the art.

Further, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960).

Regarding claim 6, the modified structure of Capote further discloses said adhesive sheet is one of a thermosetting resin sheet and a thermoplastic resin sheet (Capote, column 6, line 41-52 and Gilleo, column 4, line 64-67).

Regarding claim 12, the modified structure of Capote further discloses said circuit board is made of polymeric resin sheet is a polyimide resin sheet as applied to claim 4 above.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified assembly of Capote (combination of Capote and Gilleo) as applied to claims 1, 5 and 6 above, and further in view of Hass (US Patent No. 6,245,695).

Regarding claim 7, the modified structure of Capote discloses all the features of the claimed invention including said conductive adhesive essentially consists of conductive particles and a thermosetting resin binder (as applied to claim 5 above), and said adhesive sheet includes a thermosetting resin (as applied to claim 6 above).

The modified assembly of Capote does not explicitly disclose said thermosetting resin being such that it begins to cure at a lower temperature than does said thermosetting resin binder.

However, Gilleo recites that the adhesive sheet (compliant interposer layer 110 is made with sufficient filler and hardener to provide a solid uncured composite to receive the conductive adhesive into the holes, column 4, line 64 to column 5, line 13).

Hass discloses a bondply material using resin material and further recites that the properties of the resin material including the strength, or durability or heat resistance or curing temperature can be adjusted to the desired value by the changing the percentage of resin and adding additives in the material, column 7, line 6-45.

Further, it can be seen from the structure of Gilleo (figure 1) that the adhesive sheet (compliant interposer 110) should be cured first to provide enough rigidity to hold the conductive adhesive in the holes in order to have reliable electrical connection.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the modified device of Capote with said thermosetting resin being such that it begins to cure at a lower temperature than does said thermosetting resin binder, in order to have enough rigidity to the conductive adhesive in the holes to have reliable electrical connection, from the teachings of Hass.

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified assembly of Capote (combination of Capote and Gilleo) as applied to claims 1 above, and further in view of Itou (US Patent No. 6,512,185).

Regarding claim 11, the modified structure of Capote discloses all the features of the claimed invention including the cross sectional size of said electrode pad (12) is larger than that of the connection terminal (24, see figure 3), but does not explicitly disclose the cross sectional size of said electrode pad is more than twice as large than that of the connection terminal. However, as can be seen from the figure the larger pad size will provide more area of coverage of the pad by the adhesive film 22, which will strengthen the pad from delamination from the board surface.

Itou, in figure 1 and discloses an insulating layer (6a) covering the periphery of the pad (3a) to increase the adhesive strength of the pad with the board (10) to avoid

Art Unit: 2841

delaminating of the pad from the board (this is the improvement on the prior art of figure 8, where the pad is delaminated).

Further, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1980).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to further modify the assembly of Capote having the cross sectional size of said electrode pad is more than twice as large than that of the connection terminal, from the teaching of Itou, in order to increase the adhesive strength of the electrode pad to avoid delamination.

Response to Arguments

7. Applicant's arguments with respect to claims 1-7, 11 and 12 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tanaka, in figure 5B and 6B discloses an assembly with electrode pad (6) larger than the component terminal (2).


Art Unit: 2841

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272 1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

IP
June 24, 2006


ISHWAR PATEL
PRIMARY EXAMINER